The opinion in support of the decision being entered today was ***not*** written for publication and is ***not*** binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte EDGARDO R. HORTALEZA

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Appeal No. 2001-1690
Application No. 08/859,407

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ON BRIEF

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Before WILLIAM F. SMITH, TIMM and POTEATE, ***Administrative Patent Judges***.

POTEATE, ***Administrative Patent Judge***.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 1-6, which are all of the claims pending in the application.

Claim 1 is representative of the subject matter on appeal and is reproduced below:

1. A method of fabricating a micromechanical device, comprising the steps of:

a) processing a wafer to form a plurality of partially fabricated devices, the devices having a micromechanical structure defined upon a first layer;

b) subdividing the wafer to separate the partially fabricated devices;

c) mounting the separated partially fabricated devices on a package with the first layer still in place;

d) undercutting the first layer from the mounted partially fabricated devices to free the micromechanical structure for movement; and

e) attaching a lid to the package.

The references relied upon by the examiner are:

Glenn	4,855,544	Aug. 8, 1989
Mignardi	5,389,182	Feb. 14, 1995
Trah et al. (Trah)	5,595,940	Jan. 21, 1997

GROUNDS OF REJECTION

1. Claims 1, 2, 3 and 6 stand rejected under 35 U.S.C. § 102(b) as anticipated by Mignardi.

2. Claim 4 stands rejected under 35 U.S.C. § 103 as unpatentable over Mignardi in view of Trah.

3. Claim 5 stands rejected under 35 U.S.C. § 103 as unpatentable over Mignardi in view of Trah and Glenn.

We reverse as to all three grounds of rejection.

BACKGROUND

The invention relates to a method of fabricating a micromechanical device. The method is particularly applicable to the production of deflectable mirror devices or digital micro-mirror devices ("DMD's"). See specification, page 7, line 30 - page 8, line 3. In general, a DMD is a multi-layered micromechanical structure formed on a wafer having a light-reflective beam or other similar mechanical member. Specification, page 3, lines 2-3. The beam is deflected in response to electrostatic attraction toward (or to) an underlying adjacent electrode which is at a different electrical potential from that of the beam. ***Id.***, lines 9-12. Deflection of the beam is facilitated by an undercut well beneath the beam which is formed by etching a spacer layer of material deposited on the wafer. ***Id.***, lines 17-19.

A problem which occurs during the manufacture of DMD's is that debris may enter the undercut well and prevent deflection

of the beam. ***See id.***, page 4, lines 7-8. One prior art method of reducing the amount of debris which enters the undercut well is disclosed in Mignardi. ***See id.***, page 4, line 27 - page 5, line 5. In Mignardi's method, a wafer comprising a plurality of devices is positioned on a dicing tape and then completely sawn to separate the devices from one another. ***See id.***, page 5, lines 1-3. The separated devices are left on the dicing tape during any further fabrication steps which may include device testing and undercutting of the spacer layer beneath the mirrors. ***See id.*** at lines 3-5.

According to appellant, Mignardi still suffers from the drawback that automatic pick-and-place equipment or human handling is required to move the devices onto the final package. In particular, the equipment/handling may generate damaging particles which enter the undercut well during transfer of a device onto the package where it is secured and hermetically sealed. ***See id.***, page 4, lines 15-20. See Appeal Brief, Paper No. 12, received June 3, 2000, page 4, first paragraph.

Appellant maintains that the method of the invention overcomes the aforementioned drawbacks of the prior art by mounting partially fabricated micromechanical devices on a

package and performing the undercutting step just prior to attaching a lid to the package. See specification, page 6, line 29 - page 7, line 5. In other words, the present invention avoids the possibility of damaging particles entering the undercut wells during transfer of the devices from the tape to the final package by performing the transfer to the final package prior to the undercutting step. See Specification, page 7, lines 5-11.

DISCUSSION

A prior art reference anticipates a claim when the reference discloses every feature of the claimed invention either explicitly or inherently. ***See Hazani v. U.S. Int'l Trade Comm'n***, 126 F.3d 1473, 1477, 44 USPQ2d 1358, 1361 (Fed. Cir. 1997).

The principal argument advanced by appellant in traversing the examiner's rejection under 35 U.S.C. § 102 is that Mignardi does not teach the claimed step of "mounting the separated partially fabricated devices ***on a package***." See Reply Brief, Paper No. 14, received November 17, 2000, pages 2-3. The examiner appears to take the position that Mignardi's disclosure of mounting a partially fabricated device onto adhesive tape and

then undercutting reads on appellant's step of mounting a partially fabricated device on a package followed by undercutting. ***See id.***, page 2. Regardless of whether the examiner's analysis is correct, the examiner has failed to establish a ***prima facie*** case of anticipation since the examiner has not shown that Mignardi teaches the final claimed step of "attaching a lid to the package" ***Id.***; see Examiner's Answer, page 6.

The examiner's position appears to be that the step of attaching a lid to the package is conventional in the art and the claims, as drafted, do not preclude the additional step of transferring an undercut device to a final package. Although the claims utilize the word "comprising" such that additional steps are not precluded, it is clear that the claims require that the lid be "attached" to the same substrate (i.e., the package) on which the devices have been mounted during a step conducted ***prior to*** the undercutting operation. Thus, the claims define over Mignardi's teaching of mounting a device on an adhesive tape, undercutting the device on the tape, transferring the device to a package and then attaching a lid to the final package, since the package is clearly a different substrate from the adhesive tape.

We note that Mignardi teaches that a protective cover 44 is used during the undercutting operation. However, we do not view the use of a protective cover as reading on "attaching a lid to the package." As explained in the specification, page 12, lines 16-17, attaching the lid to the package "hermetically seal[s] the micromechanical device therewithin." Mignardi's cover is placed over the ***exposed adhesive*** 21 or dicing tape 22, as opposed to over the devices, and there is no indication in Mignardi that the cover is actually "attached" to the tape. See Mignardi, column 4, lines 24-27;

Accordingly, the rejection of claims 1, 2, 3 and 6 is reversed.

Claims 4 and 5 were rejected under 35 U.S.C. § 103 as unpatentable over Mignardi in view of various secondary references. The examiner does not rely on the secondary references for a teaching or suggestion of the step of "attaching a lid." Thus, having found that the examiner has failed to establish that the subject matter of claim 1 is unpatentable over Mignardi, we also find a similar failure to establish unpatentability with respect to claims 4 and 5 which depend from claim 1. The rejections of claims 4 and 5 are reversed.

In sum, the we reverse the following rejections:

1. claims 1, 2, 3 and 6 under 35 U.S.C. § 102(b) as anticipated by Mignardi;

2. claim 4 under 35 U.S.C. § 103 as unpatentable over Mignardi in view of Trah; and

3. claim 5 under 35 U.S.C. § 103 as unpatentable over Mignardi in view of Trah and Glenn.

REVERSED

WILLIAM F. SMITH Administrative Patent Judge	)	
CATHERINE TIMM Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
LINDA R. POTEATE Administrative Patent Judge	)	

LRP:psb

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